

# Mineral analysis of dry extracts from the seeds of the plant *Silybum marianum* (L. Gaertner) introduced in Uzbekistan

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## ABSTRACT

*Silybum marianum* (L.) Gaerth. (Asteraceae) is a valuable medicinal plant. In the domestic and foreign literature the following pharmacological properties of the medicinal forms from *Silybum marianum* are described: antioxidant, antitoxic, hemostatic, hepatoprotective, detoxification, choleric, anti-inflammatory, wound healing, reparative, laxatives, tonic, improving digestion, cholekinetic, cholesecret [1,2]. In Uzbekistan, the development of products for functional and therapeutic-preventive purposes for preventing various diseases and strengthening protective functions body, reducing the risk of exposure to harmful substances, including for the population living in ecologically unfavorable zones [3]. Macro and microelement analyzes of dry extract from asparagus seeds were performed. It was found that the extract contained balanced macro and microelements. Based on the results of the experiments, the product was recommended for use in biologically active supplements.

**Keywords:** Milk Thistle seeds, dry extract, macro and micronutrients, Iron, Biologically active supplements.

## 1. INTRODUCTION

The amount of macro-and micronutrients contained in biologically active supplements is important for living organisms, especially human health, as they are a nutrient component involved in various physiological functions. In a healthy human body, Mendeleev has a number of elements that are present in the periodic table of elements. They play a key role in the building function of the body, especially in the structure and proper formation of bones. Minerals are important in maintaining the acid-base balance in the body, the formation of the required amount of hydrogen ions in bones and tissues, as well as in interstitial and intercellular fluids, as well as their osmotic properties, the normal course of metabolism. Minerals are a component of intercellular fluids and are involved in the formation of cells in the blood and bone, in the regulation of the nervous system, in the regulation of muscle as well as cardiovascular muscle tone. Minerals such as vitamins direct coenzymes and play an important role in the body's growth, regeneration, and energy production. All enzymatic processes present in the body are carried out at the expense of micro and macronutrients, so they are very important in the processing of minerals, vitamins and other nutrients. [4] The concentration of mineral elements in the human body is not uniform.

## 2.MAIN PART

When the minerals present in human tissue are measured in grams, the concentration of many other mineral elements in the body is less than 1: 100,000. Elements in which the chemical elements measured in grams in the human body are present in very small concentrations are called micronutrients.



1-fig. *Silybum marianum* (L.)

The mineral elements in the tissues of the body change significantly with age. During the rapid growth of the human body and the development of stature, the amount of microelements also increases and slows down or stops at the age of 17-20 years. The following table shows the mineral content of the human body with an average weight of 70 kg. [5] Lack of micro and macro elements in the human body leads to rapid disease and convulsions.

1 table

Chemical element	gr	%	Chemical element	gr	%	Chemical element	gr
Calcium	1510	2.2	Sodium	105	0.15	Manganese	remnants
Phosphorus	540	1.2	Magnesium	70	0.1	Cobalt	remnants
Potassium	245	0.35	Iron	3.5	0.005	Chrome	remnants
Sulfur	105	0.15	Zinc	1.75	0.00025	Molybdenum	remnants
Chlorine	105	0.15	Copper	0.07	0.00011		

The fruits of the milk thistle have been used to treat a number of diseases for over 2,000 years. It is widely

used in practice as a hepatoprotective agent, especially in liver diseases. Drugs based on milk thistle extract are used in the regeneration of the liver, as an antioxidant, anti-inflammatory and hepatoprotective agent in the treatment of hepatitis, cirrhosis of the liver. In addition, the dried extract of gum thistle fruit has been studied in experiments to show that its beneficial side in the fight against viruses and tumors can be an effective tool in preventing damage to the body from chemotherapy. [6] It should also be noted that the analysis of mineral elements in plants is one of the most complex methods of analysis and requires the use of high-precision approaches and methods. At present, the implementation of a number of effective methods that provide fast and high accuracy for the analysis of trace elements has opened up a wide range of possibilities in this regard.

### 3. MATERIALS AND METHODS

Analysis of macro and microelements in samples of dry extract from the fruit of Milk thistle was carried out in the laboratory of the Research Institute of Bioorganic Chemistry named after Sadikov under the Academy of Sciences of the Republic of Uzbekistan.

Method of quantitative determination of micro and macro elements by inductive method coupled plasma mass spectrometry (ICP-MS)., Appliances and utensils used: ISPMSNEXION-2000 or similar mass spectrometer ., Microwave decomposition device (Germany) or similar., Teflon autoclaves

Volumetric flasks ., Reagents used: multi-element standard No. 3 (for 29 elements for MS) standard for –Hg (mercury) nitric acid (c / h) bidistilled water hydrogen peroxide (c / h) argon (gas purity 99.995%)

### 4. EXPERIMENTAL PART

Dry extract from Milk thistle seeds was obtained by modern accelerated method. The dry extract of asparagus seeds is a light yellow powder with a characteristic odor.

0.0500-0.5000 g, an accurate sample of the test substance is weighed on an analytical balance and transferred to Teflon autoclaves. Then the autoclaves are filled with an appropriate amount of purified concentrated mineral acids (nitric acid (chemically pure) and hydrogen peroxide (chemically pure)). The autoclaves are closed and placed on a Berghofc microwave digester with the MWS-3 + software or a similar type of microwave digester. Determine the decomposition program based on the type of test substance, indicate the degree of decomposition and the number of autoclaves (up to 12 pcs). After decomposition, the contents in the autoclaves are quantitatively transferred into 50 or 100 ml volumetric flasks and the volume is adjusted to the mark with 0.5% nitric acid.

The determination of the substance under study is carried out on an ISPMS device or a similar device, the optics of an emission spectrometer with an inductively coupled argon plasma. In the method of determination, indicate the optimal wavelength of the determined micro or macro elements, at which they have the maximum emission.In the construction of the sequence of analyzes, indicate the amount in mg and the degree of its dilution in ml. After receiving the data, the true quantitative content of the substance in the test sample is automatically calculated and entered by the device in the form of mg / kg or µg / g with error limits - RSD in% .

### 5. RESULT AND DISCUSSIONS

Quantitative analysis of samples showed a large amount of phosphorus - up to 9477.017 mg / kg, potassium - up to 9469.416 mg / kg, calcium - up to 6620.220 mg / kg, magnesium - up to 3741.564 mg / kg, phosphorus - up to 9477.017 mg / kg, sodium - 644.594 mg / kg and these elements were found to constitute the main elemental content. The composition of the elements is as follows: sulfur - up to 556.628 mg / kg, iron - up to 223.128 mg / kg, silicon - up to 195.841 mg / kg, aluminum - up to 79.572 mg / kg, boron - up to 44.421 mg / kg, zinc - 39.995 mg / kg up to 26.577 mg / kg of strontium, up to 24.981 mg / kg of copper, up to 16.816 mg / kg of manganese, up to 8.891 mg / kg of titanium, up to 6.699 mg / kg of barium, up to 5.647 mg / kg of rubidium , chromium-4,296 mg / kg each.The amount of ultra microelements is as follows: Nickel - up to 1.953 mg / kg, selenium - up to 0.253 mg / kg, lithium - up to 0.201 mg / kg, vanadium - up to 0.176 mg / kg, cobalt - up to 0.114 mg / kg , silver-0.086 mg / kg

Toxic elements lead, cadmium, beryllium, mercury, and thallium were found to be low in milk thistle fruit extract, and their content was found to meet sanitary rules and norms' №0283 hygienic standards. The results of the analysis are presented in the table below.

Name of macro and microelements	Quantity, mg / kg	Name of macro and microelements	Quantity, mg / kg
Li7	0.201	K 39	9469.416
Be 9	0.034	Ca 42	6620.220
B 11	44.421	Ti 48	8.891
Na 23	644.594	V 51	0.176
Mg 24	3741.564	Cr 52	4.296
Al 27	79.572	Mn 55	16.816
Si 28	195.841	Fe 57	223.128
P 31	9477.017	Co 59	0.114
S 32	556.628	Ni 60	1.953
Cu 60	24.981	Sr 88	26.577

Zn 66	39.995	Zr 90	0.319
Ga 69	0.296	Nb 93	0.006
Ge 74	0.003	Mo 98	0.784
As 75	0.083	Ag 107	0.086
Se 82	0.253	Cd 111	0.348
Rb 85	5.647	In 115	0.002
Sb 121	0.045	Pb 208	0.592
Cs 133	0.012	Bi 209	0.007
Ba 138	6.699	Tl 205	0.001
Ta 181	0.001	U 238	0.009
W 184	0.021		
Re 187	0.007		

## 6. CONCLUSION

The dry extract of milk thistle fruit contains optimal amounts of flavolignans, amino acids, carbohydrates, proteins and vitamins, as well as trace elements of iron, silicon, zinc, chromium, silver.

Based on the results obtained, it was determined that it is advisable to include milk thistle dry extract in medicines and biologically active supplements in food.

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